



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,048	08/06/2001	Anders Malthe-Sorensen	CON-1006D2	1208

7590 03/22/2005
Cheryl S Ratcliffe
CONOCO INC
P O Box 4783
Houston, TX 77210-4783

EXAMINER

BRODA, SAMUEL

ART UNIT PAPER NUMBER

2123

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/923,048

Applicant(s)

MALTHE-SORENSEN ET AL.

Examiner

Samuel Broda

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-75 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 36-43 is/are allowed.
- 6) ☒ Claim(s) 44, 45 and 47-75 is/are rejected.
- 7) ☒ Claim(s) 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10 December 2001.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Art Unit: 2123

DETAILED ACTION

1. Claims 36-75, submitted in a divisional application of 09/542,307, now U. S. Patent 6,370,491, have been examined.

Drawings

2. Applicants' formal drawings have been reviewed and approved.

Specification

3. The disclosure is objected to because of the following informalities: the reference to the parent Application requires updating to reflect its patent number and issue date.

Abstract

4. The abstract of the disclosure is objected to because it does not adequately describe the invention.

Claim Objections

5. Claim 46 is objected under 37 CFR § 1.75 as being a substantial duplicate of claim 36. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to reject the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Art Unit: 2123

Claim Rejections - 35 U.S.C. § 112, First Paragraph

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6.1 Claims 44-45 and 47-75 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The use of a module including a dynamic range relaxation algorithm for simulating the model is critical or essential to the practice of the invention, but not included in the claims. See MPEP § 2172.01 and *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

The determination that the dynamic range relaxation module is critical or essential is based on the following references to the dynamic range relaxation algorithm made in the Specification:

1. In the present invention, the over-relaxation is concentrated in those nodes where the greatest movement occurs. This **significantly speeds up** the computation time. (page 8 lines 9-11; emphasis added);
2. Once the model has been defined, the deformations are applied to the model 109. The result of deformation is to produce a deformed model with faulting and fracturing therein. This determination of the deformation process is carried out using a Dynamic Range Relaxation model 115 that is discussed in further detail below. (page 11 lines 13-17);

Art Unit: 2123

3. In the present invention, a modified relaxation scheme is used for solving the deformation problem. (page 22 lines 9-10);
4. The method of the present invention combines the basic Dynamic Range Relaxation Algorithm (DRRA) with steps that include fracturing and faulting. **This is a novel aspect of the present invention.** (page 23 lines 7-9; emphasis added); and
5. For the problem of fracturing and faulting in the present invention, this relaxation method is **significantly faster** than prior art methods mentioned above. For example, in two dimensions, the number of computer time steps for solving the system is proportional to $L^{1.3}$. This compares with a number of time steps for a conjugate gradient scheme of L^4 . (page 25 lines 13-17; emphasis added).

Claim Rejections - 35 U.S.C. § 112, Second Paragraph

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7.1 Claim 73 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claim 73 refers to being dependent on claim 9, but there is no claim 9 active in the Application. Additionally, it is unclear from the remainder of the claims which claim Applicants intend claim 73 to be dependent from.

Art Unit: 2123

Claim Rejections - 35 U.S.C. § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

...

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.1 Claims 44-45 and 47 are rejected under 35 U.S.C. 102(b) as being anticipated by Olsen et al, "Three-Dimensional Dynamic Simulation of the 1992 Landers Earthquake," Science, Vol. 278 No 5410, pp. 834-838 (31 October 1997).

8.2 Regarding claim 44, Olsen et al teaches a graphical user interface (GUI) for displaying and manipulating a model of a plurality of interconnected nodes for simulating fracturing and faulting in a subsurface volume of the earth comprising:

(a) a module for presenting graphical images representative of said interconnected nodes [Figs. 2 and 3, based on fourth-order staggered-grid finite difference model; page 835 column 1 paragraph 3 and page 836];

(b) a module for defining material properties of the model [model input includes "slip-weakening distance D0" and "yield stress level"; see page 835 column 1 paragraph 4 through column 3 paragraph 2];

Art Unit: 2123

(c) a module for defining an initial deformation applied to the model [model input includes “initial stress on the fault before rupture starts”; see page 835 column 2 paragraph 4]; and

(d) a module for defining simulation parameters [simulation parameters called “three-dimensional modeling parameters” and shown in Table 1, page 835 top of column 3].

Therefore, Olsen et al anticipates claim 44.

8.3 Regarding claims 45 and 47, Olsen et al teaches the display of graphical images of the model output in cross-sectional, two-dimensional, and three-dimensional views. See Figs. 2-4.

Allowable Subject Matter

9. Claims 36-43 are allowed.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to Applicants’ disclosure. Reference to Khan et al, United States Patent 6,826,520 is cited as teaching a method of upscaling permeability for unstructured grids.

11. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (571) 272-3709. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

Serial Number: 09/923,048

Page 7

Art Unit: 2123

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (571) 272-3716. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (571) 272-2100.

A handwritten signature in black ink, appearing to read 'S. Broda'.

**SAMUEL BRODA, ESQ.
PRIMARY EXAMINER**